

GEOTHERMAL IN SMART CITIES AND COMMUNITIES

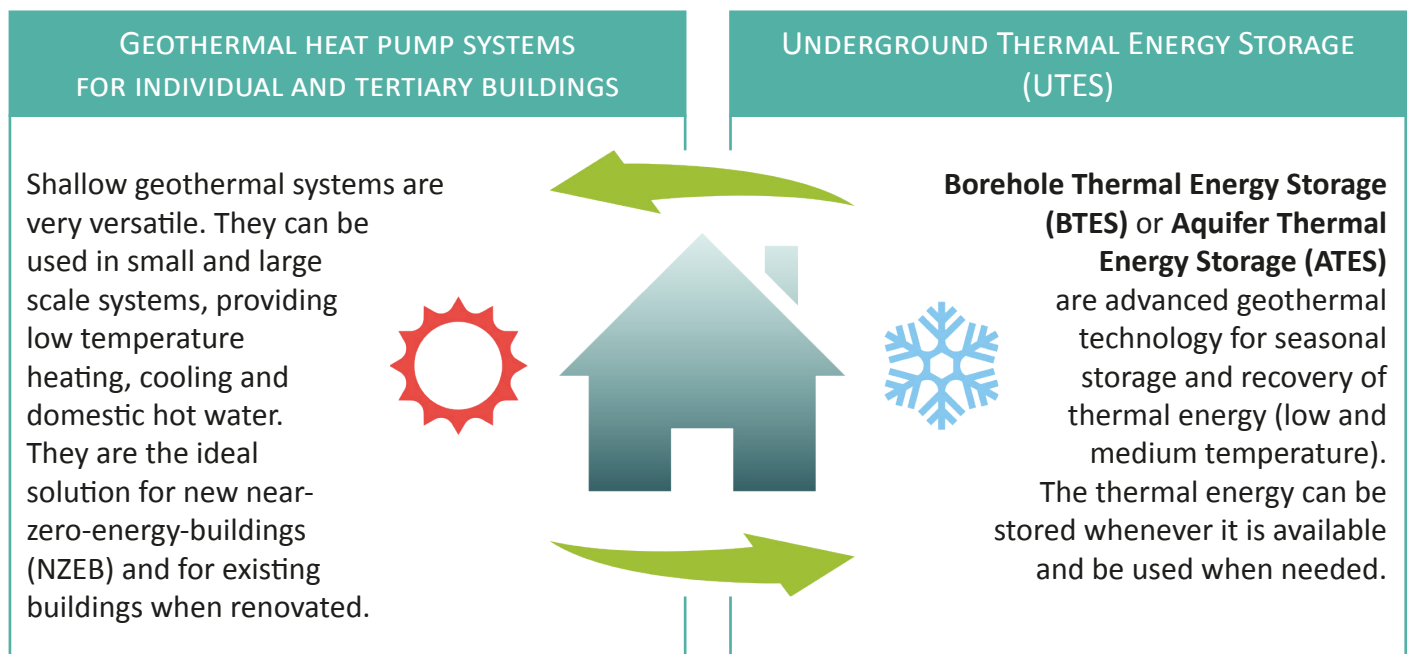
The future of our current energy is moving towards Smart Cities and Smart Rural Communities, where the integration of combined technologies using renewable energy sources reduces the environmental impact and offers citizens a better quality of life.

Geothermal has a particularly important role in smart electricity and thermal grids, since it can deliver both heating and cooling and electricity.

SHALLOW GEOTHERMAL IN SMART ENERGY SYSTEMS

Shallow geothermal, assisted by heat pumps, is a key energy source for smart energy systems. It provides solutions for the future energy system by coupling smart thermal and electricity grids via underground thermal storage and by ensuring a reliable and affordable heating and cooling supply to both urban and rural areas.

Types of technology which enable the integration of shallow geothermal energy into the smart energy systems include:



As both of these technologies can be installed in grid and off-grid heating and cooling systems, they perfectly fit the new smart cities and rural communities approach.

In addition, there is also an important role for shallow geothermal energy in connections with and management of smart electricity grids. Geothermal heat pumps can provide demand response services, thereby contributing to grid stabilisation, whilst UTES is an excellent storage solution.

Shallow geothermal technologies will be utilised in the next generation of district heating: **Smart Thermal Grids**.

SMART THERMAL GRIDS

Smart Thermal grids will use renewable energy like geothermal to ensure a reliable and affordable heating and cooling supply to various customers. This is possible because they are:

FLEXIBLE, ADAPTING



- In the short-term to the energy supply and demand situation.
- In the medium-term by adapting the temperature level in existing networks and the installation of new distributed micro-networks
- In the long-term by aligning the network development with urban planning.

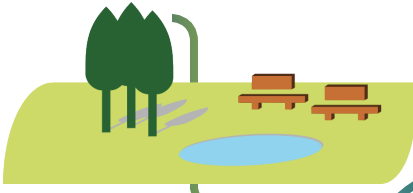
INTELLIGENT

They are intelligently planned and operated, and enable the end-user to interact with the heating and cooling system. They can, for instance, supply heating or cooling back to the network and to off-grid applications.



EFFICIENT

They are designed to achieve the highest overall efficiency of the energy system, by choosing the optimal combination of technologies and enable a maximum exploitation of available local energy resources by cascade usage.

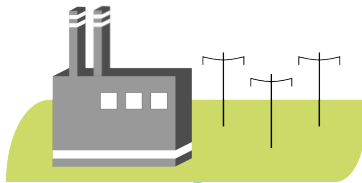


INTEGRATED

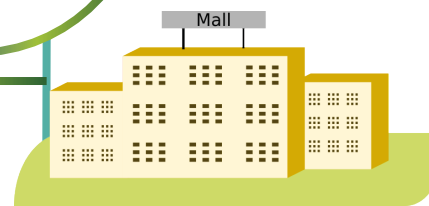
They are integrated in the whole urban energy system from a spatial point of view (related to urban planning parameters and processes), and from an energy system point of view (e.g. optimising the interfaces

COMPETITIVE

They are cost effective in a way that makes operation affordable, both for consumers and businesses. They increase the cost efficiency of heating and cooling supply, and create opportunities for customers to participate.



to other urban networks – electricity, sewage, waste, ICT, etc).



SECURING ENERGY SUPPLY

They increase security of energy supply at a local level by using local sources of energy for heating & cooling.



SIZABLE

These systems can be both applied for neighbourhood level or city-wide, according to the demand of heat and cold.

